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16. Apparatus as defined in claim 15, wherein said transport means comprises a pair of vertically spaced deflection wheels (13, 33) having parallel horizontal axes of rotation, and an endless transport member (30) mounted on said deflection wheels, the piston and cylinder assemblies of each pair being mounted in opposite locations on said endless transport member, respectively.

17. Apparatus as defined in claim 16, wherein one of said deflection wheels includes a rotably mounted axle (14), said output shaft being connected with said axle.

18. Apparatus as defined in claim 16, wherein the pistons and cylinders of all of said assemblies have the same dimensions, respectively.

[Cancel claim 10, and rewrite as follows:]

19. Apparatus as defined in claim 18, wherein the positions of the pistons of each pair of assemblies relative to their associated cylinders are automatically reversed when the assemblies are being transported by said endless transport means around said deflection wheels, respectively.

#### REMARKS

In a separate Letter to the Official Draftsman, permission has been requested to add certain reference numerals to the drawing.

Claims 13-19 now stand in the application, new parent claim 13 being based on original claims 1, 4, 8, 9, 11, and 12, and new dependent claims 14-19 being based on original claims 2, 3, 5-7, and 10, respectively.

Allowance of the amended claims is courteously solicited for the following reasons:

The present invention relates to a gravity-activated fluid displacement power generator of the type that is well known in the prior art, as shown by the references of

record. As succinctly stated in the cited Diamond patent No. 3,934,964 on column 4, lines 37-47:

The gravity-actuated power generator 10 as described accordingly basically comprises a plurality of variable-buoyancy variable-displacement containers (the cylinders) which, by virtue of gravity-actuated pump elements (the freely-sliding pistons) constantly displaces ballast (first fluid 42) to the downwardly-moving side of a driven element (drive belt 12). The continuing displacement of ballast to one side of a rotatable system creates a constant unbalance which drives the system.

The Examiner has questioned the effects of friction on the invention. Frictional problems are not only inherent problems of the present invention, but also of any engine, device, or apparatus in which two elements are moved relative to each other. This is well known in the art. Further, it is well known in the art to reduce frictional problems, for example, by lubricating. However, it is also well known in the art that frictional problems in general cannot be eliminated but only be reduced. Therefore, it is necessary to take measures to provide driving forces which are able to overcome frictional forces and to eliminate as far as possible any other problems reducing the driving forces.

According to Applicant's invention as recited in new parent claim 13, the pistons 21 of the piston and cylinder assemblies 12 have a length --  $l_k$  -- that is critical relative to: (a) The density of the fluid (for example, water) in which the system is immersed, (b) the depth --  $h$  -- to which the lowermost assembly is submerged during travel by the endless transport belt 11, and (c) the density of the material from which the pistons are formed. Other features specific to the invention are recited in dependent claims 14-19.

More particularly, during the rotational movement of the piston and cylinder assemblies, they are completely immersed in the liquid, thereby avoiding problems at the surface of the liquid since the assemblies do not have to move through a gas-liquid-interface. Furthermore, to ensure that the piston of a piston-and-cylinder unit can be slidably moved from its retracted position into its extended position by the weight acting on it against the fluid pressure acting on it in the opposite direction, it is necessary that

the piston length satisfies the equation given in new parent claim 13. Further, the cylinder chambers have to be connected to each other to permit fluid exchange. Thus, the fluid that is driven out of a cylinder chamber into which a piston is sliding because the respective piston-cylinder unit is changing its moving direction from up to down, can flow into the cylinder chamber of that piston-cylinder unit the piston of which is sliding into its extracted position due to a change of the moving direction from down to up. In case that the fluid within the cylinder chambers is a liquid, the weight acting on that piston that is moving into its cylinder chamber, is also acting as an additional force on that piston that is moving out of its cylinder chamber. This additional force is transferred by the liquid in the system. Therefore, it is possible to overcome any residual friction between the piston and the respective cylinder as well as the force acting on the latter piston due to the pressure of the surrounding fluid.

In the event that the medium in cylinder chambers is a gas like air, the weight of the upper piston moving into its cylinder is transferred by the air cushion formed between the two pistons in question. However, in this case, the air cushion between the upper piston and the lower piston acts like a spring coupling these pistons.

It is clear from the specification, and in particular from the explanation of the forces acting on the piston-cylinder units, that the apparatus will start due to the differences in buoyancy of the piston-cylinder units that occur due to the different positions of the pistons relative to the corresponding cylinders. Usually, a torque generated by an engine or the like can be used to drive several types of machines or the like. In particular, on Page 4, lines 36 to 38, it is clearly stated that the generator is used for the generation of electrical energy.

Applicant courteously contends that the invention recited in the new claims is clearly patentably distinguishable from the cited prior art.

The Diamond patent No. 3,934,964 discloses a gravity-actuated fluid displacement power generator but fails to disclose or to suggest that the pistons of the piston-cylinder

units are constructed in such a way that the length thereof satisfied the equation given in new claim 13. Assuming that the power generator as described by Diamond will work at a certain efficiency, this efficiency will be degraded, if this power generator is enlarged so that the lower end of the apparatus; i.e., the maximum depth of immersion of the piston-and-cylinder units into the liquid becomes greater. The generator possibly will still work, but the efficiency will be reduced in accordance with the increasing depth. In particular, there is no suggestion in Diamond to increase the length of the pistons as a function of the maximum depth of immersion of his apparatus. Therefore, the pistons do not satisfy the equation given in new claim 13. If the length of the piston is chosen in accordance with the equation in question, it can be ensured that frictional problem and problems caused by the pressure of the surrounding fluid can be overcome.

The Kusmer patent No. 3,412,482 discloses a buoyance demonstrating apparatus having bodies the volume of which can be changed in accordance with the moving direction. However, Kusmer fails to disclose a piston cylinder unit having the piston the length of which satisfies the equation of new claim 13. In contrast, the bodies used by Kusmer consists of an elongated guide cage 15, a bellow 14 that encloses a volume to be changed and a weight 16 for extending and compressing the bellow 14 in dependence on its relative position thereto; i.e., as shown on the left hand side in Fig. 1 the bellow 14 is extended by the weight 16 when the weight 16 is located below the bellow 14. On the other side, the right hand side in Fig. 1 the bellow 14 is compressed by the weight 16 when the weight is located above it.

As to the dimensions of the weight, in particular of the length thereof, the same is true as for the pistons used by Diamond.

The British patent No. 35,705 discloses another buoyance apparatus having a plurality of bodies which alter their volume when changing the direction of movement. As can be seen from Figs. 3, 4, and 5, each of the bodies consists of a bellows-like device which is coupled to a lever carrying a weight for expending and compressing the bellows.

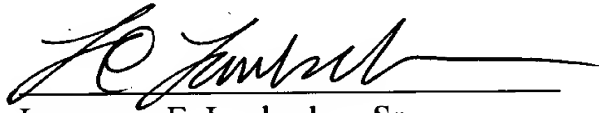
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Fig. 3 shows the bellows in its expended position, whereas Fig. 4 shows it in the compressed condition. This apparatus is completely different from that specified in the new claim 13.

Since it is courteously believed that all the matters of form have been dutifully complied with, and since the new claims 13-19 are respectfully believed to be patentably distinguishable from the cited prior art, allowance of the application is courteously solicited.

Respectfully submitted,

3/26, 2001



Lawrence E. Laubscher, Sr.  
EFS Customer No. 30267311  
Registration No. 18,202  
LAUBSCHER & LAUBSCHER  
745 South 23rd Street, Suite 300  
Arlington, Virginia 22202  
Telephone: (703) 521-2660